

FCC MAIL SECTION

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Before the  
Federal Communications Commission  
Washington, D.C. 20554

DISPATCHED BY

In the Matter of

Amendment of Part 87 to Permit the  
Use of 112-118 MHz for Differential Global  
Positioning System (GPS) Correction Data  
and the Use of Hand-held Transmitters  
on Frequencies in the Aeronautical  
Enroute Service

and

Amendment of Part 17 Concerning  
Construction, Marking, and Lighting of  
Antenna Structures

WT Docket No. 96-211  
RM-8607, 8687

## NOTICE OF PROPOSED RULE MAKING

Adopted: October 9, 1996

Released: November 21, 1996

Comment Date: January 15, 1997

Reply Comment Date: January 30, 1997

By the Commission:

## I. INTRODUCTION AND EXECUTIVE SUMMARY

1. This *Notice of Proposed Rule Making (Notice)* proposes to amend Part 87 of our rules to permit aeronautical ground stations to use frequencies in the 112-118 MHz band to transmit differential Global Positioning System (GPS)<sup>1</sup> information to aircraft equipped to use advanced landing systems in response to a petition for rule making filed by the Federal Aviation Administration (FAA).<sup>2</sup> This *Notice* also proposes to allow the use of hand-held radios for direct communications between ground service personnel and flight crews on frequencies allocated to

<sup>1</sup> GPS and differential GPS technologies are described in para. 3 *infra*.

<sup>2</sup> See Petition for Rule Making by Federal Aviation Administration (FAA), RM No. 8687 (filed August 7, 1995) (FAA Petition).

the Aeronautical Enroute Service in response to a petition for rule making<sup>3</sup> filed by Aeronautical Radio, Inc. (ARINC).<sup>4</sup> Finally, this *Notice* proposes to update Part 17 of our rules to incorporate by reference two recently revised FAA Advisory Circulars. We believe that adoption of these proposed rule changes would increase aircraft and airport safety and facilitate the efficient use of aeronautical radio spectrum.

## II. DISCUSSION

### A. Differential Global Positioning System Correction Data

2. On August 7, 1995, the FAA filed a request to permit Part 87 aeronautical ground stations at airports to use frequencies in the 112-118 MHz band<sup>5</sup> to transmit differential GPS information to aircraft.<sup>6</sup> According to the FAA, it has developed a Special Category I (SCAT-I) precision landing and approach specification to enable near-term use of GPS for aircraft landing operations by private users.<sup>7</sup> It states that this specification was formalized in RTCA Document No. DO-217,<sup>8</sup> which established standards for a GPS augmentation system operating in the 112-118 MHz band.<sup>9</sup> The FAA believes that this flexible use of the spectrum will increase aviation safety during landings and approaches by promoting the use of satellite technology to aid in the precision landing of aircraft. The FAA's request was placed on Public Notice.<sup>10</sup> No comments were received in response to the Public Notice.

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<sup>3</sup> See Petition for Rule Making by ARINC, RM No. 8607 (filed February 2, 1995) (ARINC Petition).

<sup>4</sup> ARINC was established in 1929 by the airline industry to provide and coordinate aeronautical communications facilities and services. ARINC continues today to render its services on a non-profit basis with cost distributed in proportion to use. To a great extent, it designs, provides, and manages the industry's communications systems. Even though its principal stockholders as well as principal customers are the U.S. air carriers, ARINC provides communications services to all aircraft operators, including foreign airlines, business entities, and private individuals.

<sup>5</sup> Frequencies in the 112-118 MHz band are now used by VHF omni-range (VOR) stations and, pursuant to 47 C.F.R. § 87.475(a), all assignments are made in accordance with recommendations made by the FAA. VOR stations are beacons that transmit two phase-related radio signals to aircraft in flight. Signals received from two VOR beacons can be used by pilots to determine the position of an aircraft.

<sup>6</sup> See *supra* note 1.

<sup>7</sup> FAA Petition at 1.

<sup>8</sup> RTCA Document No. DO-217, *Minimum Aviation System Performance Standards/Differential Global Navigation Satellite System Instrument Approach System: Special Category I (SCAT-I)*, August 27, 1993.

<sup>9</sup> FAA Petition at 1.

<sup>10</sup> See FCC Public Notice No. 2095 (August 29, 1995).

3. By way of background, the GPS is a satellite-based global navigation system originally developed by the U.S. Department of Defense to enhance the effectiveness of U.S. military forces. Over the years, GPS has also been used in civilian applications requiring precise location information (e.g., mapping, surveying, and navigation). The GPS consists of twenty-four satellites, with the orbits of these satellites designed so that multiple satellites are passing over any given spot on the earth's surface at any given time. Each satellite transmits a time-coded signal. A GPS receiver then uses data from multiple satellites to rapidly calculate the location, altitude, and velocity of the vehicle or aircraft carrying the receiver.

4. The location accuracy achieved by a particular GPS receiver depends on the accuracy of each satellite's clock, variances in each satellite's orbit, and daily fluctuations in the radio propagation characteristics of the ionosphere. In addition, the accuracy of the GPS system is purposefully degraded by the Department of Defense for national security reasons. For civilian use, GPS receivers are generally considered to be accurate within approximately 100 meters horizontally. This accuracy can be improved to better than one meter, however, by using a technique called "differential GPS." Differential GPS employs two GPS units or receivers. In addition to the mobile GPS receiver (e.g., the receiver on an aircraft), another receiver (stationary receiver) is placed at a location where the precise coordinates are already known (reference point). The stationary receiver calculates the difference between the reference point and the predicted location using GPS data. The difference between the two locations is the error in the GPS signal. Error correction data can then be transmitted to a mobile GPS unit to increase the accuracy of the position information shown by that unit.

5. The FAA requests that we amend Part 87 of our rules to allow entities participating in its SCAT-I landing and approach system to use unassigned VOR frequencies in the 112-118 MHz band to transmit error correction data obtained using differential GPS to units aboard aircraft.<sup>11</sup> Allowing Part 87 aeronautical ground stations at airports to use VOR frequencies in this manner would increase navigation accuracy and thereby increase safety in aircraft landings and approaches. By limiting such use to unassigned VOR frequencies, we eliminate the possibility of interference with VOR operations. Further, the Commission has granted nine developmental licenses for such systems<sup>12</sup> and has received no complaints of harmful interference to VOR stations. Thus, we do not believe that allowing the operations proposed by the FAA will increase the incidence of harmful interference in the 112-118 MHz band. As a result, we propose to allow aeronautical ground stations to use unassigned VOR frequencies in the 112-118 MHz

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<sup>11</sup> FAA Petition at 1.

<sup>12</sup> The nine systems are Interstate Electronics Corp., (landing area not listed), Anaheim, CA, granted 6/11/96; Intersate Electronics Corp., Mojave Airport, Mojave, AZ, granted 6/11/96; Continental Airlines Inc., Newark International Airport, Newark, NJ, granted 6/05/96; Metropolitan Airports Commission, Minneapolis-St Paul International Airport, Minneapolis, MN, granted 4/04/96; Aeronautical Radio Inc., Alliance Fort Worth Airport, Fort Worth, TX, granted 9/15/95; Honeywell Inc., Rochester Airport, Rochester, MN, granted 6/30/95; State of Wisconsin, Wittman Regional Airport, Oshkosh, WI, granted 10/28/93; Aeronautical Radio Inc., (landing area not listed), Newark, NJ, granted 11/15/93; Aeronautical Radio Inc., (landing area not listed), Houston, TX, granted 11/15/93.

band to transmit differential GPS data. In order to expedite assignment of these frequencies, we also propose to require proof from the applicants that frequency assignments were coordinated with the FAA prior to seeking a Commission authorization.

6. Additionally, to accommodate the technical parameters of these proposed new ground station transmitters, we propose to amend 47 C.F.R. § 87.137(a) to include "14KG7D"<sup>13</sup> as an authorized type of emission. We also propose to amend 47 C.F.R. § 87.171 to designate "RLP" as the symbol for the class of station for differential GPS ground stations. We invite comments concerning these proposals as well as any alternatives thereto. We also seek comment on the following issues:

(a) Should an applicant for a differential GPS ground station be required to notify the applicable airport authority or aviation service organizations prior to receiving an authorization for operation at a particular airport? Should the Commission prohibit multiple licensees from operating at a single airport or, in the alternative, limit the number of licensees operating at a single airport?

(b) What measures may be taken to expedite coordination procedures between applicants, the FAA, and the Commission concerning the assignment of a frequency and time slot for differential GPS ground stations?

(c) The proposed rules would require differential GPS transmitters to be type accepted in accordance with the proposed technical criteria set forth in Appendix B (47 C.F.R. §§ 87.131, 87.133(a)(5), 87.137(a), 87.139(j), 87.145, and 87.147(d)), in lieu of the specifications contained in RTCA Document No. DO-217. We believe that this flexible approach promotes technological innovations in differential GPS equipment consistent with the National Airspace System (e.g., changes in coding methodology or data timing structure) without requiring the Commission's rules to be amended to incorporate changes unrelated to radiofrequency interference. Under our present treatment of transmitters operating in the 108-137 MHz band,<sup>14</sup> the FAA is given a 21-day period to object to any application for type acceptance that would adversely affect the performance of the National Airspace System. Are these proposed requirements sufficient to ensure proper operation of differential GPS ground station transmitters? If not, what would constitute sufficient requirements?

#### **B. Use of Hand-Held Transmitters on Aeronautical Enroute Service Frequencies**

7. On February 2, 1995, ARINC filed a petition to permit use of hand-held radios on frequencies allocated to the Aeronautical Enroute Service so that flight crews can communicate

<sup>13</sup> The emission designator "14KG7D" refers to a data or telemetry transmission with a necessary bandwidth of 14 kHz that is phase-modulated and contains one or more channels of digital information together with one or more channels of analog information. See 47 C.F.R. § 2.201.

<sup>14</sup> See 47 C.F.R. § 87.147(d).

directly with ground service personnel while the aircraft is on the ground.<sup>15</sup> According to ARINC, today's commercial aircraft require direct wireless contact between flight crews and ground service personnel in lieu of the present means of communications through a dispatch center or via a tethered communication line physically connecting ground personnel with an aircraft. ARINC contends that this need for a wireless radio link arises from recent FAA regulations concerning de-icing aircraft prior to take-off, increased traffic on airport runways, and the safety hazards associated with tethered connections.<sup>16</sup> ARINC argues that the lack of a direct wireless communications capability compromises safety of airport personnel and often results in unnecessary delays in persons aboard aircraft being able to obtain service or supplies.<sup>17</sup> ARINC's petition was placed on Public Notice.<sup>18</sup> No comments were received in response to the Public Notice.

8. Aeronautical Enroute stations provide for operational control (e.g., flight management) of aircraft along domestic or international air routes. Operational control communications are defined as communications relating to the safe, efficient and economical operation of the aircraft.<sup>19</sup> Examples of operational control communications are communications concerning fuel, weather, aircraft position and performance and requests for essential services and supplies. Currently, the rules do not permit direct communications between the flight crews and ground service personnel via hand-held radios. Instead, the flight crews and ground service personnel must communicate through the aeronautical enroute ground station (base station), or a wired connection to the plane on the ground.

9. Because of the concerns presented by ARINC, we tentatively conclude that allowing hand-held radio operation on aeronautical enroute frequencies will increase airport safety, promote the more efficient use of aviation spectrum, and reduce waiting times for aircraft to obtain essential services and supplies. Therefore, we propose to allow the use of hand-held radios at airports for communications by ground service personnel with aircraft or the associated enroute station. In order to reduce administrative burdens on both the public and the Commission, we further propose to permit such mobile units to operate under the same authorization and call sign as the associated aeronautical enroute station. This approach would eliminate the need for aviation service organizations to submit forms and fees to the Commission, while minimizing administrative burdens on the Commission. We seek comment on our proposal and tentative conclusion. We also seek comment on the following issues:

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<sup>15</sup> See *supra* note 2.

<sup>16</sup> ARINC Petition at 2.

<sup>17</sup> ARINC Petition at 2.

<sup>18</sup> See FCC Public Notice No. 2059 (February 28, 1995).

<sup>19</sup> See 47 CFR § 87.261.

(a) Should the present technical specifications and type acceptance requirements governing the use of aircraft hand-held radio equipment (47 C.F.R. 87.131, 87.133(a)(5), 87.137(a), 87.139(a), 87.141(a), 87.145(b), and 87.147(d)) be applied to hand-held radio operation on aeronautical enroute frequencies?

(b) We do not propose to limit the number of hand-held transmitters authorized under an aeronautical enroute license. What would be the advantages and disadvantages of limiting the number of hand-held transmitters authorized at a single airport? If the number of hand-held transmitters was limited, what would be a reasonable maximum number? Is there a need for the Commission to keep track of the exact number of hand-helds being used at each airport?

(c) ARINC's petition requests that hand-held transmitters, which are commonly battery operated, low power, and of limited range, be permitted to operate on aeronautical enroute frequencies. Should the Commission allow such hand-held transmitters to be connected to external power sources or to high gain antennas that increase their range?

### C. Revised FAA Advisory Circulars

10. In the *Report and Order* in WT Docket No. 95-5, we incorporated, by reference, two FAA Advisory Circulars, "Obstruction Marking and Lighting" (AC 70/7460-1H), August 1991, as amended by Change 2, July 15, 1992, and "Specification for Obstruction Lighting Equipment" (AC 150/5345-43D), July 1988, in Part 17 of our rules.<sup>20</sup> The Commission chose this approach in order to unify federal guidelines concerning the painting and lighting of antenna structures. In doing so, we stated that if the FAA makes substantive amendments to either of these Advisory Circulars, the Commission would initiate a public proceeding prior to updating Part 17 of our rules.<sup>21</sup> In this connection, the FAA has recently made substantive amendments to both Advisory Circulars. Accordingly, we propose to incorporate the revised FAA Advisory Circulars, AC 70/7460-1J (January 1, 1996) and AC 150/5345-43E (October 19, 1995), in Part 17 of our rules.<sup>22</sup> We propose not to require Antenna structure owners that were previously assigned painting and/or lighting requirements by the Commission to update their structures in accordance with the revised Advisory Circulars unless specifically recommended by the FAA. We seek comment on this

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<sup>20</sup> See *Streamlining the Commission's Antenna Structure Clearance Procedure and Revision of Part 17 of the Commission's Rules Concerning Construction, Marking, and Lighting of Antenna Structures*, *Report and Order*, WT Docket No. 95-5, 11 FCC Rcd 4272 (1996). FAA Advisory Circulars are available upon request, free of charge, from Department of Transportation, Utilization and Storage Section (Publications), M443.2, 400 7th Street SW, Washington, DC 20591, telephone (202) 366-0039 or (202) 366-0451.

<sup>21</sup> *Id.*, para. 48.

<sup>22</sup> The Advisory Circulars (which are attached as Appendix C) are available in the Commission's docket file in this proceeding or may be purchased from the Commission's copy contractor, International Transcription Service, Inc., 2100 M Street, Suite 140, Washington, D.C. 20037, telephone (202) 857-3800. The Commission must obtain authorization from the Director of the Federal Register prior to incorporating by reference the two FAA Advisory Circulars in Part 17 of our rules. See 1 C.F.R. Part 51.

proposal.

### III. CONCLUSION

11. Accordingly, we propose to amend Part 87 of our rules to permit: (1) licensing of the frequencies 112-118 MHz for aeronautical ground stations transmitting differential GPS corrections; and (2) the use of frequencies in the Aeronautical Enroute Service by hand-held radios under certain circumstances. We also propose to amend Part 17 of our rules to incorporate by reference two recently revised FAA advisory circulars concerning antenna structure painting and lighting. The proposed actions will increase the safety and efficiency of aircraft navigation and movement of aircraft in and around airports. Further, adoption of these proposals would promote the use of new radio technologies beneficial to aircraft without allocating additional spectrum.

### IV. PROCEDURAL MATTERS

#### A. *Ex Parte* Rules - Non-Restricted Proceeding.

12. This is a non-restricted notice and comment rule making proceeding. *Ex Parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206(a).

#### B. Initial Regulatory Flexibility Analysis

13. An Initial Regulatory Flexibility Analysis is contained in Appendix A.

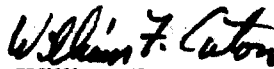
#### C. Comment Dates

14. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before January 15, 1997, and reply comments on or before January 30, 1997. To file formally in this proceeding, you must file an original and four copies of all comments, reply comments, and supporting comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus nine copies. You must send comments and reply comments to Office of the Secretary, Federal Communications Commission, Washington, DC 20554. You may also file informal comments by electronics mail. You should address informal comments to [mayday@fcc.gov](mailto:mayday@fcc.gov). You must put the docket number of the proceeding on the subject line ("WT Docket No. 96-211). You must also include your full name and Postal Service mailing address in the text of the message. Formal and informal comments and reply comments will be available for public inspection during regular business hours in the F.C.C. Reference Center of the Federal Communications Commission, Room 239, 1919 M Street, N.W., Washington, DC 20554.

15. For further information, contact Mr. Jim Shaffer, Private Wireless Division, Wireless Telecommunications Bureau, at (202) 418-0680 or at [mayday@fcc.gov](mailto:mayday@fcc.gov).

16. Authority for issuance of this *Notice of Proposed Rule Making* is contained in Sections 4(i) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i) and 303(r).

FEDERAL COMMUNICATIONS COMMISSION



William F. Caton  
Acting Secretary



## APPENDIX A

## INITIAL REGULATORY FLEXIBILITY ANALYSIS

As required by Section 603 of the Regulatory Flexibility Act,<sup>23</sup> the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the expected significant economic impact on small entities by the policies and rules proposed in the *Amendment of Part 87 to Permit the Use of 112-118 MHz for Differential Global Positioning System (GPS) Correction Data and the Use of Hand-held Transmitters on Frequencies in the Aeronautical Enroute Service, and Amendment of Part 17 Concerning Construction, Marking, and Lighting of Antenna Structures*. Written public comments are requested on the IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the *Notice of Proposed Rule Making*, provided in paragraph 14 of the item.

**I. Need for and Objectives of the Proposed Rule:** The purpose of this *Notice of Proposed Rule Making* is to determine whether it is in the public interest, convenience, and necessity to amend our rules to permit licensing of frequencies in the 112-118 MHz band for aviation ground monitoring systems that are associated with the GPS; to permit under limited circumstances the use of frequencies in the aeronautical enroute service for hand held radios. These proposed actions should increase the safety and efficiency of aircraft navigation and movement of aircraft in and around airports. We also propose to incorporate by reference two recently revised FAA advisory circulars concerning antenna structure painting and lighting.

**II. Legal Basis:** Authority for issuance of this *Notice of Proposed Rule Making* is contained in Sections 4(i) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i) and 303(r).

**III. Description and Estimate of the Number of Small Entities to Which Rule Will Apply:** The proposed amendments will affect small businesses that use, manufacture, design, import, or sell a GPS augmentation system operating in the 112-118 MHz band. We tentatively conclude that these small businesses are classified in Communications Equipment, N.E.C., (Standard Identification Code 3669) as entities employing less than 750 employees as defined in 13 CFR §121.201. We invite comment on whether this is the correct definition to use. The size data provided by the SBA shows that 469 firms out of 498 firms in the communications equipment, nec classification have less than 750 employees but does not enable us to make a meaningful estimate of the number of potential GPS manufacturers which

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<sup>23</sup> 5 U.S.C. § 603.

are small businesses.<sup>24</sup> However, based on information from the U.S. GPS Industry Council we estimate that this would include approximately 110 small businesses that would be affected by this proposed rule change.

#### **IV. Description of Projected reporting, recordkeeping, and other compliance**

**requirements:** In order to facilitate operation of a GPS augmentation system operating in the 112-118 MHz band, these proposed rules may have significant economic impact on a substantial number of small businesses. Prior to marketing a GPS augmentation system operating in the 112-118 MHz band in the U.S., a manufacturer must have the unit type accepted by the Commission under the technical criteria set forth in the RTCA Document No. DO-217, *Minimum Aviation System Performance Standards/Differential Global Navigation Satellite System Instrument Approach System: Special Category I (SCAT-I)*, August 27, 1993. In order to have a unit type accepted, a small entity would have to test the radio equipment and provide clerical support to file the requisite FCC application forms. Both of these functions could be handled by a third party. We estimate that the initial cost to the manufacturer to meet this requirement, if done by a third party, is \$900 to test the equipment and complete the filing information, and would require the electronic engineering professional skills. Additionally, there would be a \$425 equipment authorization fee to file the application for type acceptance. These costs are one time costs to type accept the equipment and assure that interference to other radio users is minimized.

#### **V. Significant Alternatives to Proposed Rules Which Minimize Significant Economic**

**Impact on Small Entities and Accomplish Stated Objectives:** The proposed rules would require differential GPS transmitters to be type accepted in accordance with the technical criteria set forth in Part 87 Subpart D of our rules, in lieu of the more exacting specifications contained in RTCA Document No. DO-217. We believe that this flexible approach promotes technological innovations in differential GPS equipment so long as such equipment is compatible with the National Airspace System. Under our present treatment of transmitters operating in the 108-137 MHz band, the FAA is given a 21-day period to object to any application for type acceptance that would adversely affect the performance of the National Airspace System. We seek comments on whether these proposed requirements are sufficient to ensure proper operation of differential GPS ground station transmitters or, if not, what would constitute sufficient requirements. The proposed rules also seek to take measures to minimize burden and expedite coordination procedures between applicants, the FAA, and the Commission concerning the assignment of a frequency and time slot for differential GPS ground stations. In order to reduce administrative burdens on both the public and the Commission, we further propose to permit mobile units in the aeronautical enroute service to operate under the same authorization and call sign as the associated aeronautical enroute station. This approach would eliminate the need for aviation service organizations to submit

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<sup>24</sup> U.S. Small Business Administration 1992 Economic Census Industry and Enterprise Report, Table 1D, SIC Code 3669, (Bureau of the Census data adapted by the Office of Advocacy of the U.S. Small Business Administration).

forms and fees to the Commission. These decision benefits small entities and give them an opportunity to provide recommendations to further improve the impact and processes.

**VI. Federal rules which overlap, duplicate or conflict with these rules: None**

**APPENDIX B**

Parts 17 and 87 of Chapter I of Title 47 of the Code of Federal Regulations are proposed to be amended as follows:

**PART 17 - CONSTRUCTION, MARKING, AND LIGHTING OF ANTENNA STRUCTURES**

1. The authority citation for Part 17 continues to read as follows:

**Authority:** Secs. 4, 303, 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303. Interpret or apply secs. 301, 303 48 Stat. 1081, 1085 as amended, 47 U.S.C. 301, 309.

2. Section 17.23 is revised to read as follows:

**§ 17.23 Specifications for painting and lighting antenna structures.**

Unless otherwise specified by the Commission, each new or altered antenna structure to be registered on or after January 1, 1996, must conform to the FAA's painting and lighting recommendations set forth on the structure's FAA determination of "no hazard," as referenced in the following FAA Advisory Circulars: AC 70/7460-1J, "Obstruction Marking and Lighting," January 1, 1996, and AC 150/5345-43E, "Specification for Obstruction Lighting Equipment," October 19, 1995. These documents are incorporated by reference in accordance with 5 U.S.C. 552(a). The documents contain FAA recommendations for painting and lighting structures which pose a potential hazard to air navigation. For purposes of this part, the specifications, standards, and general requirements stated in these documents are mandatory. The Advisory Circulars listed above are available for inspection at the Commission Headquarters in Washington, DC, or may be obtained from Department of Transportation, Property Use and Storage Section, Subsequent Distribution Office, M483.6, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785, telephone (301) 322-4961, facsimile (301) 386-5394.

**PART 87 - AVIATION SERVICES**

1. The authority citation for Part 87 continues to read as follows:

**Authority:** 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, unless otherwise noted. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended, 47 U.S.C. 151-156, 301-609.

2. Section 87.131 is amended by adding to the end of the table, the class of station for Differential GPS to read as follows:

### § 87.131 Power and emissions.

Class of Station	Frequency band/frequency	Authorized emission	Maximum power <sup>1</sup>
* * * * *			
Aircraft earth	UHF	G1D,G1E,G1W	60 watts. <sup>8</sup>
Differential GPS	VHF	G7D	Various. <sup>2</sup>

<sup>1</sup> The power is measured at the transmitter output terminals and the type of power is determined according to the emission designator as follows:

(i) Mean power (pY) for amplitude modulated emissions and transmitting both sidebands using un modulated full carrier.

(ii) Peak envelope power (pX) of all emissions designators other than those referred to in paragraph (i) of this row.

<sup>2</sup> Power and antenna height are restricted to the minimum necessary to achieve the required service.

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<sup>8</sup> Power may not exceed 60 watts per carrier. The maximum EIRP may not exceed 2000 watts per carrier.

3. Section 87.133 is amended by adding to the table in paragraph (a) in the (5) Band-100 to 137 MHz: entry, the category of station Differential GPS to read as follows:

### § 87.133 Frequency stability.

Frequency band (lower limit exclusive,upper limit Tolerance<sup>1</sup> Tolerance<sup>2</sup>  
inclusive), and categories of stations.

* * * * *			
(5) Band-100 to 137 MHz:			
Aeronautical stations	450	50	
* * * * *			
Radionavigation stations	20	20	
Differential GPS			2
* * * * *			

<sup>1</sup> This tolerance is the maximum permitted until January 1, 1990, for transmitters installed before January 2, 1985, and used at the same installation. Tolerance is indicated in parts in 10<sup>6</sup> unless shown as Hertz (Hz).

<sup>2</sup> This tolerance is the maximum permitted after January 1, 1985, for new and replacement transmitters after January 2, 1990. Tolerance is indicated in parts in 10<sup>6</sup> unless shown as

Hertz (Hz).

\* \* \* \* \*

<sup>4</sup> The tolerance for transmitters type accepted between January 1, 1996, and January 1, 1974, is 30 parts in  $10^6$ . The tolerance for transmitters type accepted after January 1, 1974, and stations using offset carrier techniques is 20 parts in  $10^6$ .

\* \* \* \* \*

4. Section 87.137 is amended by adding to the table in paragraph (a) in its alphabetical order, the class of emission G7D to read as follows:

**§ 87.137 Types of emission.**

\* \* \* \* \*

Class of emission	Emission designator	Below 50 MHz	Authorized bandwidth (kilohertz)	
			Above 50 MHz	Frequency deviation
		* * * * *		
G7D.....	14K0G7D		25	

\* \* \* \* \*

5. Section 87.139 is amended by revising paragraph (a), and adding a new paragraph (j) to read as follows:

**§ 87.139 Emission limitations.**

(a) Except of ELTs and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the frequency bands 1435-1535 MHz and 2310-2390 MHz or digital modulation (G7D) for differential GPS, the mean power of any emission must be attenuated below the mean power of the transmitter (pY) as follows:

\* \* \* \* \*

(j) When using G7D for differential GPS in the 112-118 MHz band, the amount of power during transmission under all operating conditions when measured over a 25 kHz bandwidth centered on either of the second adjacent channels shall not exceed -25 dBm and shall decrease 5 dB per octave until -52 dBm.

6. Section 87.171 is amended by adding in its alphabetical order the symbol and class of station for RLP to read as follows:

**§ 87.171 Class of station symbols.**

\* \* \* \* \*

RLP - Differential GPS

\* \* \* \* \*

7. Section 87.173 is amended by revising the frequency table in paragraph (b) to add the listing 112-118 MHz.

**§ 87.173 Frequencies**

(b) \* \* \*

Frequency or frequency band	Subpart	Class of station	Remarks
	* * * * *		
112-118 MHz.....	Q	RLP	Differential GPS
	* * * * *		

8. Section 87.261 is amended by adding paragraph (e) to read as follows:

**§ 87.261 Scope of Service**

\* \* \* \* \*

(e) Hand-held units may be operated under an aeronautical enroute station authorization so long as the units are limited to use at an airport and are only used to communicate with aircraft on the ground or the associated aeronautical enroute station. Hand-held units are further limited to operation on the VHF frequencies listed in 87.263(a)(1).

9. Section 87.475 is amended by adding paragraph (e) to read as follows:

**§ 87.475 Frequencies.**

\* \* \* \* \*

(e) *Frequencies available for differential GPS stations.* Frequencies in the

112-118 MHz band may be assigned to Special Category I (SCAT-I) ground stations for differential GPS data links.

(1) The frequencies available are on 25 kHz centers with the lowest assignable frequency being centered at 112.000 MHz and the highest assignable frequency being centered at 117.950 MHz

(2) Applicants must obtain a frequency and time slot assignment from the FAA.